UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/896,514	06/23/1997	CONRAD OLIVER GARDNER	95-004M	3272

7590 03/03/2004

Conrad O. Gardner
1502 N. 97th Street
Seattle, WA 98103

EXAMINER	
LERNER, AVRAHAM H	

ART UNIT	PAPER NUMBER
3611	

DATE MAILED: 03/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 28

Application Number: 08/896,514
Filing Date: June 23, 1997
Appellant: GARDNER, CONRAD OLIVER

Conrad Gardner
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 4, 2001 and the supplemental brief filed February 24, 2003. The appendix attached with the latter presents all appealed claims in current form and the amendment filed December 3, 2003 is considered a proper amendment to place the claims in the form presented in the appendix.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the original brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences that will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the original brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

This appeal involves claims 34-37, 40, 41, 46-51, and 54-61

Claims 38, 46, 47, 56, and 57 have been amended subsequent to the final rejection, which amendments have been approved by the examiner.

Claims 38, 39, and 52 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 30-33 and 53 are allowed.

(4) Status of Amendments After Final

The amendment after final rejection (labeled as an "Appendix") filed on December 3, 2003 has been entered.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows:

A. Whether claims 46-49, 55, 57, 58, 60, and 61 are indefinite under 35 U.S.C. 112, 2nd paragraph;

B. Whether claims 34-37, 50, 54, and 57-61 are anticipated by Ellers;

C. Whether claims 37, 40, 46, 47, 51, 55, and 61 are anticipated by Kenyon;

D. Whether claims 37, 40, 50, 51, 54, 55, and 57-60 are anticipated by Lynch et al.;

E. Whether claim 41 is made obvious by Ellers;

F. Whether claim 56 is made obvious by Lynch et al.;

G. Whether claim 48 is made obvious by Kenyon in view of Ellers.

(7) Grouping of Claims

The appellant's statement in the brief that certain claims do not stand or fall together is not agreed with because appellant asserts that no claims stand or fall together, but does not make arguments for the patentability of each claim on its own merits.

Claims 34-36 stand or fall together.

Claims 37, 40, and 41 stand or fall together in that there are no arguments directed to the specific limitations found in either of the dependent claims, but merely on the basis that it depends from a claim appellant believes to be allowable.

Claims 46 and 47 stand or fall together.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix of the papers filed February 24, 2003 to the brief is correct.

(9) Prior Art of Record

4,165,795	LYNCH et al.	8-1979
4,438,342	KENYON	3-1984
4,923,025	ELLERS	5-1990

(10) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

Claims 46-49, 55, 57, 58, 60, and 61 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 46 is indefinite and confusing because it twice positively recites traction wheels, and it is unclear whether the second occurrence (line 5) is referring to the same set as the first occurrence (line 4) or a different set of wheels. This ambiguity renders the claim (and those depending therefrom) indefinite, and therefore fails to distinctly claim the subject matter which the applicant regards as his invention, as required by the statute.

Claim 49 is indefinite because it is unclear what is meant by, nor is there proper antecedent basis for the limitation "the period of torque transfer".

Claim 55 recites the limitation "the cruise mode" in line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim 57 recites the limitation "the cruise mode" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Regarding claim 58, it is noted that the limitation "utilizing an internal combustion engine having a horsepower approximately 20 to 30 percent of the horsepower of an equivalent weight internal combustion only powered vehicle" is indefinite. For example, a 1991 Pontiac Sunbird and a 2002 Acura NSX are "equivalently weighted internal combustion only powered" vehicles, and yet according to www.edmunds.com have listed peak power ratings of 96 hp and 290 hp, respectively. This disparity is considered more than simply a broad limitation, in that one skilled in the art would not be able to ascertain the metes and bounds of that which is being claimed. Further, as technology advances, and "equivalently weighted internal combustion only powered" vehicles become more efficient and more powerful, the scope of the present claim would also change, and therefore does not distinctly claim appellant's invention.

Claim 60 recites the limitation "the cruise mode" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 61 is indefinite and confusing because it twice positively recites drive wheels, and it is unclear whether the second occurrence (line 8) is referring to the same set as the first occurrence (line 4) or a different set of wheels. This ambiguity renders the claim (and those depending therefrom) indefinite, and therefore fails to distinctly claim the subject matter which the applicant regards as his invention, as required by the statute.

Claim Rejections - 35 USC § 102

Claims 34-37, 50, 54, and 57-61 are rejected under 35 U.S.C. 102(b) as being anticipated by Ellers.

Ellers discloses a hybrid vehicle and method for controlling the same comprising all elements as broadly claimed, including an internal combustion engine (21), controlled to run at a constant speed (see abstract, lines 19-21) at least when driving at highway speeds and power a first set of drive wheels (15, 17) through a coupling means (torque converter 35); and an electric motor (7) coupled via a coupling means (transmission 9) to a second set of drive wheels, and wherein the electric motor powers the vehicle until a "cruise mode" is reached (e.g. 55 mph as stated in column 1, lines 56), at which point the electric motor is disengaged from its drive wheels, and the internal combustion engine alone drives the hybrid vehicle, and wherein a DC generator (63) is driven via a clutch (65) by the engine. When in "cruise mode", if the operator pushes down hard on the accelerator pedal (see especially column 4, lines 17-32), the electric motor, which had been disengaged from its set of drive wheels, is coupled to the drive wheels in order to provide acceleration for the operator.

Claims 37, 40, 46, 47, 51, 55, and 61 are rejected under 35 U.S.C. 102(b) as being anticipated by Kenyon.

Kenyon discloses a hybrid vehicle and method for controlling the same comprising all elements as broadly claimed, including an internal combustion engine (10), alternatively powering a first set of drive wheels (20, 22) through a coupling means (clutch 12), or charging the batteries via an alternator (34); and an electric motor (54) coupled to a second set of drive wheels, and wherein the electric motor powers the vehicle until a "cruise mode" is reached (see column 4, lines 64-65), at which point the electric motor is disengaged from its drive wheels, and the internal combustion engine alone drives the hybrid vehicle. When in "cruise mode", if the

operator pushes down hard on the accelerator pedal (see especially column 4, lines 17-29), the electric motor, which had been disengaged from its set of drive wheels, is coupled to the drive wheels in order to provide acceleration for the operator. Note column 5, lines 3-6 which specifies that the clutch control can be accomplished using well known speed sensing devices. Also note that acceleration would be accomplished by pressing an accelerator pedal, whether the speed of the vehicle had previously been dropping or not, as recited in claim 55.

Claims 37, 40, 50, 51, 54, 55, and 57-60 are rejected under 35 U.S.C. 102(b) as being anticipated by Lynch et al. (U.S. Patent No. 4,165,795).

Lynch et al. discloses a hybrid vehicle and method for controlling the same comprising all elements as broadly claimed, including an internal combustion engine (20) and electric motor (12) alternatively powering a pair of drive wheels, means (see Fig. 3) for detecting a vehicle running state (vehicle engine speed), control means (see control circuit detailed in Figs. 6a and 6b) for controlling whether to transfer a driving force generated by an engine to a power generator with a specific no-load speed which dictates whether the motor drives the wheels or the internal combustion engine. Also note that the internal combustion engine is "constrained to a small range of speeds about its most efficient operating speed" (column 3, lines 55-59), which is specifically to maximize fuel efficiency and minimize engine wear and exhaust emissions. Note that acceleration would be accomplished by pressing an accelerator pedal, whether or not the speed of the vehicle had previously been dropping, as recited in claim 55.

Claim Rejections - 35 USC § 103

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ellers.

Ellers discloses a hybrid vehicle comprising all elements as claimed, as recited above in detail, except for disclosing that the internal combustion engine powers the vehicle at "about 40 miles per hour" (Ellers states 55 mph). Even if applicant believes that 55 mph is not "about 40 mph", it would have been obvious to one having ordinary skill in the art at the time the invention was made to reduce the control switch at "about 40 miles per hour," since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Such a modification would have enabled the internal combustion engine to drive the vehicle more frequently than if the control was set for 55 mph, reducing the overall drain on the battery and therefore would have been obvious to one of ordinary skill in the art at the time of the invention.

Claim 56 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lynch et al.

Lynch et al. discloses a method of operating a hybrid vehicle comprising all steps as claimed, including operating the ICE within a small range of speeds (see abstract lines 10-13) about its most efficient operating speed, and utilizing the engine to charge a "fast charge-discharge" battery when the ICE is not employed to drive the motor (see the paragraph bridging columns 8 and 9), but fails to specifically teach using a nickel cadmium battery. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a nickel cadmium battery, since it has been held to be within the general skill level of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. See *In re Leshin*, 125 USPQ 416. Such a modification would have

provided the vehicle with a known, dependable, rechargeable battery as was known at the time of the invention, and therefore would have been obvious to one of ordinary skill.

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kenyon in view of Ellers.

Kenyon discloses a hybrid vehicle power train comprising all elements as claimed, as recited above in detail, except for providing a safety feature wherein in the event of an inoperable electric motor, the internal combustion engine provides power to the traction wheels.

Ellers discloses that it is known in the art to provide a hybrid vehicle with a safety feature wherein, if the charge of the drive batteries (5) gets too low (column 3, lines 29-34), and therefore the electric motor is inoperative, the processor will enable driving of the generator 63, and the internal combustion engine 21.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the vehicle power train of Kenyon with the safety feature of Ellers in order to prevent failure of the vehicle while driving. Such a modification would have ensured that if the battery power gets too low, perhaps due to extended stop-and-go driving, then the internal combustion engine can be used to power the drive wheels and continue steady operation of the vehicle without requiring the operator to stop and recharge.

(11) Response to Argument

35 U.S.C. 112

Regarding the rejections of claims 46 and 61 as being indefinite for positively reciting two sets of "traction wheels" and "drive wheels", respectively, appellant argues that if the scope

of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite (see arguments on page 3, with reference to claim 55). In response it is noted that this double positive recitation is inherently unclear for the reasons stated in the final rejection of December 3, 2002. In reciting a first torque flow path coupled to traction wheels and a second flow path coupled to traction wheels, it is unclear whether appellant intends to mean that the first and second flow paths are connected to the same set of traction wheels, or to a different set of traction wheels. Both arrangements are common in the art, but require very different structures, and this ambiguity would render the scope of the claimed subject matter unclear to one skilled in the art.

Regarding the rejections of claims 49, 55, 57, and 60 for a lack of antecedent basis for the limitations "the cruise mode" and "the period of torque transfer", appellant argues that no antecedent basis is necessary, because these terms are not unclear. In response, it is noted that "the cruise mode" and "the period of torque transfer" are not clearly defined limitations inherent to a vehicle, and require positive recitation. See also MPEP 2173.05(e), which reads, "[t]he lack of clarity could arise where a claim refers to 'said lever' or 'the lever' where the claim contains no earlier recitation or limitation of a lever and where it would be unclear as to what element the limitation was making reference." In the instant case, "the cruise mode" and "the period of torque transfer" render the scope of the claim indeterminate, and therefore these elements must have proper antecedent basis in the claims.

Regarding claim 58, appellant argues that the metes and bounds of the claim are clearly ascertainable, and contends that the examiner's comparison of two equivalent weight internal combustion only powered vehicles has no bearing on the claim because appellant is comparing

the present internal combustion engine to that of an ICE-only powered vehicle. However, it is noted that the examiner selected two equivalent weight ICE-only powered vehicles having extremely different horsepower ratings in order to demonstrate how indefinite the language of the claim is. To define the horsepower of the claimed invention in terms of state of the art vehicles outside appellant's own invention is improper and indefinite.

35 U.S.C. 102

Issue B

Regarding claims 34-36, appellant argues that Ellers fails to teach a "control circuit activating second coupling means for connecting said combustion engine to an electric generator for charging a battery during the cruise mode off condition." In response, it is first noted that the very nature of hybrid vehicles is to provide a means to selectively connect a combustion engine to an electric generator in order to charge a battery when the engine is not used to power the vehicle. This is the intent of constructing a vehicle as a hybrid and is inherent to the entire class of vehicles. Ellers teaches a vehicle having independent driving capability by either a battery-powered electric motor or a constant speed internal combustion engine (ICE), and wherein a DC generator (63) is selectively driven via a clutch (65) by the ICE when the engine is not used to drive the vehicle, and which operation is controlled via a controller (25).

Regarding claim 37, it is noted that the engine of Ellers does not always power the wheels of the vehicle (see column 3, lines 65-67), and does power the generator (column 2, lines 45-47), and the controller dictates operation of the engine and entire drive system.

Regarding claim 50, a "cruise mode" can be considered to occur when "the vehicle has reached a desirable cruising speed, such as 55 mph" (column 1, lines 55-56), at which point the

electric motor is automatically cut out if there is no call for a high rate of acceleration (column 1, lines 58-59). In that this transition happens immediately, the cruise mode is considered to occur after a "predetermined period of time," as broadly recited.

Regarding claim 54, Ellers does in fact teach the logic circuit to be responsive to vehicle speed and accelerator pedal information. Note claim 1, paragraphs (g) and (j), which specifically point out speed sensor means and override means responsive to the vehicle accelerator.

Regarding claim 57, it is noted that the electric motor is in fact used primarily when the vehicle is not in the "cruise mode", as can be understood by the language in column 1, lines 53-61, which teaches that after the vehicle has reached some threshold speed (e.g. 55 mph), AND no high rate of acceleration is required, the electric motor is cut out and the vehicle is powered solely by the ICE.

Regarding claim 58, as recited above in detail, the teaching of utilizing an ICE having a horsepower approximately 20 to 30 percent of an equivalent weight ICE only powered vehicle is so broad as to encompass any reasonable engine, and therefore this limitation cannot serve to define over the prior art. Additionally, Ellers states (in the last sentence of the abstract, and at column 4, lines 6-7) that the engine is designed to run at constant speed when in the cruise mode.

Regarding in claim 59 the limitation of a "fast charge-discharge battery", it is noted that in fact rechargeable batteries used in any vehicle, particularly hybrid vehicles, are inherently "fast charge-discharge" batteries. They are selected for this exact purpose, and further this language does not provide metes and bounds that can be drawn between the battery of Ellers and that of the present application. Appellant has argued (in paper #22) and presented as evidence a citation of MPEP Section 2173.04, that "breadth is not indefiniteness", and it is pointed out that

applicant can not argue that terms such as "fast-charge battery" is very broad language, and also argue that the batteries of the prior art documents do not charge fast enough to meet such a limitation.

Regarding claim 60, Ellers clearly teaches "controlling the operation of the electric motor and combustion engine in response to vehicle operating parameters", for example when the vehicle speed exceeds 55 mph, and does not require a high rate of acceleration.

Regarding claim 61, Ellers shows a transmission that transfers an output power of the electric motor to drive wheels, and a variable torque converter that transfers an output power of the engine to other drive wheels, each of which is selectively actuated, as recited above in detail.

Issue C

Regarding claim 37, Kenyon does in fact teach a control means (e.g. switcher 41) for controlling whether to transfer a driving force generated by an engine to power a generator or wheels in accordance with a vehicle running state, wherein the control means transfers the driving force generated by the engine to the wheels when the running state is more than a predetermined value, transfers the driving force generated by the engine to the power generator when the running state is less than a predetermined value. This can be seen throughout the specification, for example in the paragraph bridging columns 4 and 5, which details exactly that which appellant is blankly contending not to be shown in Kenyon.

Regarding claim 46, the control circuit shown in Figs. 1 and 4 is considered a "logic control circuit" as broadly claimed, and meets the functional language limitations that follow.

Regarding claim 55, Kenyon captures power through alternator 34 from the continuously running engine as recited in the method steps highlighted in appellant's arguments. As recited

above in detail, the limitation "fast charge-discharge battery" has such breadth and lack of parameters that it fails to define over any rechargeable battery used for automotive purposes, as would have inherently been used by Kenyon.

Regarding claim 61, the means for coupling the electric motor is accomplished with switcher 41 moving switch 80, and the means for coupling the engine is accomplished with the clutch 12. The indicated allowability of claim 61 in an Office action by another examiner in August of 2000 is no longer pertinent in that prosecution was re-opened and non-final rejections were presented in the action mailed December 3, 2002.

Issue D

Regarding claim 37, Lynch et al. does in fact teach a control means (e.g. see Figs. 6a and 6b) for controlling whether to transfer a driving force generated by an engine to power a generator or wheels in accordance with a vehicle running state (load), wherein the control means transfers the driving force generated by the engine to the wheels when the running state is more than a predetermined value (e.g. travelling uphill), transfers the driving force generated by the engine to the power generator when the running state is less than a predetermined value. This can be seen throughout the specification, for example in column 1, lines 41-50, which details exactly that which appellant is blankly contending not to be shown in Lynch et al.

Regarding claim 50, as is commonly done in the art, the ICE is used to drive the vehicle in constant load driving situations, and when the vehicle needs to accelerate or go up hill (high load levels), the electric motor is also employed to supplement vehicle power. As recited above, the "cruise mode" is therefore considered be employed when rapidly shifting power and speed demands are not occurring for predetermined periods of time.

Regarding claim 54, the vehicle operating parameters including vehicle speed and accelerator pedal information are taught by Lynch et al., specifically in that any increase in vehicle speed will result in an increase in engine load (see column 1, lines 51-57) and the information from this load and from the accelerator pedal (24, see Fig. 1 and column 4, lines 53-58) is used by the control means to control operation of the electric motor and the combustion engine.

Regarding claim 55, Lynch et al. captures power from the continuously running engine (see column 4, lines 42-45) as recited in the method steps highlighted in appellant's arguments. As recited above in detail, the limitation "fast charge-discharge battery" has such breadth and lack of parameters that it fails to define over any rechargeable battery used for automotive purposes, as would have inherently been used by Lynch et al. (see column 5, lines 17-18).

Regarding claim 57, Lynch et al. clearly sets forth that when in a "cruise mode", the engine provides all power to drive the vehicle, but when a load is placed on the engine, either by a hill, or acceleration demands, the electric motor is called on by the controller to provide additional power.

Regarding claim 58, as recited above in detail, the teaching of utilizing an ICE having a horsepower approximately 20 to 30 percent of an equivalent weight ICE only powered vehicle is so broad as to encompass any reasonable engine, and therefore this limitation cannot serve to define over the prior art.

Regarding claim 59, these limitations are in fact disclosed throughout the specification, specifically that when a load is placed on the engine, the electric motor is used to assist in

driving the vehicle (column 3, lines 19-31), and transferring power when the ICE continues to run (when the clutch disengages the engine from the drive train, see e.g. column 4, lines 42-45).

Regarding claim 60, as recited above, the vehicle operating parameters are recited in detail in Lynch et al. to be when a load is placed on the engine, for example by encountering a hill or a call for the vehicle to accelerate.

Issue E

As recited above, appellant makes no arguments directed to the merits, limitations, or language specific to claim 41, and therefore it must be considered to stand or fall with claim 37.

Issue F

Regarding claim 56, appellant argues that Lynch et al. does not teach a method comprising the step of charging a battery when an ICE is "not employed to drive the motor vehicle". In response, the examiner notes the repeated teachings of exactly what is written in the claims, for example column 4, lines 42-45: "the clutch 23 may be used to disengage the engine from the transmission and drive train so that the engine may operate the generator separately." This generator, which is driven when the ICE is not employed to drive the motor vehicle, charges the vehicle battery 14 as is conventional in the hybrid vehicle art.

Issue G

Regarding claim 48, appellant again contends that Kenyon does not teach a logic control circuit which could meet the functional limitations as claimed. However, as recited above and in the previous Office action, the switcher 41 and series of control switches shown in Fig. 4 is considered a logic control circuit as broadly recited, and these switches do perform the

functions claimed. In response to applicant's argument that the safety feature of the hybrid of Ellers could not have been used in the vehicle of Kenyon, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In the instant case, Ellers teaches that a safety mechanism allowing the ICE to power the vehicle when the electric motor is incapable would have been beneficial in that an operator would still be able to drive the vehicle, and therefore would have been safer and more reliable than without the safety mechanism.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

A. Lerner 2/22/04
Avraham Lerner
February 22, 2004

Conferees
Lesley Morris, SPE LDM
Kevin Hurley KH

Conrad O. Gardner
1502 N. 97th Street
Seattle, WA 98103